

CLAIMS

1. A domestic heat and power system comprising a dchp unit, a dchp unit controller, a programmer module and an energy scheduler arranged to communicate with a domestic appliance, wherein:

the dchp unit controller, the programmer module and the energy scheduler are linked to allow communication therebetween;

the dchp unit is operable under command of the dchp unit controller to generate heat for heating a home and/or to provide hot water for the home and to generate electricity for supply to the home;

the energy scheduler is operable to receive power requirement information from the domestic appliance and to cause the domestic appliance to operate;

the programmer module is operable to receive data input by a consumer and to generate a corresponding heating and/or hot water schedule therefrom;

the dchp unit controller is operable to determine operating times of the dchp unit in accordance with the heating and/or hot water schedule provided by the programmer module and to provide the dchp unit operating times to the energy scheduler; and

the energy scheduler is operable to receive the dchp unit operating times and to determine operating times of the domestic appliance using the dchp unit operating times.

2. A domestic heat and power system according to claim 1, further comprising a connection to an electrical grid operable to supply electricity generated by the dchp unit to the grid.

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3. A domestic heat and power system according to claim 1 or claim 2, wherein the programmer module is operable to display information relating to the domestic heat and power system.

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4. A domestic heat and power system according to any of claims 1 to 3, further comprising communication means operable to exchange information with one or more remote locations.

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5. A heat and power system according to claim 4, wherein the communication means comprises a modem operable to communicate via a telephone network.

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6. A heat and power system according to claim 4 or claim 5, wherein the programmer module is operable to receive information from service or product providers via the communication means.

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7. A heat and power system according to any of claims 4 to 6, wherein the programmer module is operable to send information about the heat and power system to a maintenance agent via the communication means.

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8. A domestic heat and power system according to any preceding claim, further comprising a first thermostat unit linked to allow communication to the programmer module.

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9. A domestic heat and power system according to claim 8, wherein the first thermostat unit is operable to measure the temperature and to display the temperature so measured, and

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further comprises adjustment means operable to allow a consumer to set a desired temperature of the home.

10. A domestic heat and power system according to claim 9,
5 further comprising one or more secondary thermostat units in communication with the first thermostat unit.

11. A domestic heat and power system according to claim 10,
10 wherein only the first thermostat unit is operable to measure the temperature and all thermostat units are operable to display the temperature so measured and further comprise adjustment means to allow the consumer to set a temperature of the home.

12. A domestic heat and power system according to any
15 preceding claim, wherein the dchp unit controller has a first part operable to control an engine of the dchp unit and has a second part operable to control one or more heating elements of the dchp unit.

20 13. A domestic heat and power system according to any preceding claim, further comprising a handheld device operable to receive data input by a consumer and to convey such information to the programmer module.

25 14. A domestic heat and power system according to claim 13, wherein the handheld device includes a thermostat.

15. A domestic heat and power system, serving a network of
30 homes, comprising:
a hub controller;

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electricity transmission means connecting the network of homes;

communication means allowing communication between the network of homes and the hub controller;

5 at least one home provided with a dchp unit, a dchp unit controller and a programmer module wherein the dchp unit controller, the programmer module and the hub controller are linked to allow communication therebetween, the dchp unit is operable under command of the dchp unit controller to generate heat for heating that home and/or to
10 provide hot water to that home and to generate electricity for use in that home and for supply into the network of homes via the electricity transmission means, the programmer module is operable to receive data input by a consumer and
15 to generate a corresponding heating and/or hot water schedule therefrom, and the dchp unit controller is operable to determine operating times of the dchp unit in accordance with the heating and /or hot water schedule provided by the programmer module and to provide the dchp unit operating
20 times to the hub controller; and

 at least one other home provided with a local energy scheduler arranged to communicate with the hub controller and a domestic appliance in that home and being operable to receive power requirement information from the domestic
25 appliance and to pass the information to the hub controller, wherein the hub controller is operable to determine operating times of the domestic appliance using the dchp unit operating times and to pass the domestic appliance operating times to the local energy scheduler that, in turn,
30 causes the domestic appliance to operate in accordance with that schedule.

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16. A domestic heat and power system according to any of claims 1 to 14, wherein the programmer module is operable to receive data input by a consumer corresponding to time bands having start and end times, a desired temperature for the home during that time band and/or confirmation that hot water is required during that time band, and the programmer module is operable to generate a corresponding heating and/or hot water schedule therefrom; and

the dchp unit controller is operable to determine operating times of the dchp unit in accordance with the heating and/or hot water schedule provided by the programmer module such that the temperature of the home reaches the desired temperature and/or hot water is available at the start time of each time band.

17. A domestic heat and power system comprising, a dchp unit, a dchp unit controller and a programmer module, wherein:

the dchp unit is operable under command of the dchp unit controller to generate heat for heating a home and/or providing hot water for the home and to generate electricity for supply to the home and/or to an electrical grid to which the home is connected;

the programmer module is operable to receive data input by a consumer corresponding to time bands having start and end times, a desired temperature for the home during that time band and/or confirmation that hot water is required during that time band, and the programmer module is operable to generate a corresponding heating and/or hot water schedule therefrom; and

the dchp unit controller is operable to determine operating times of the dchp unit in accordance with the

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heating and/or hot water schedule provided by the programmer module such that the temperature of the home reaches the desired temperature and/or hot water is available at the start time of each time band.

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18. A domestic heat and power system according to claim 16 or claim 17 the dchp unit further comprising a main burner and a supplementary burner, wherein operation of the main burner generates electricity and wherein the dchp unit
10 controller determines the dchp unit operating times according to a rule that firing of the supplementary burner should be minimised.

19. A domestic heat and power system according to claim 18,
15 wherein the dchp unit controller is operable to determine the dchp unit operating times such that there is a period where the main burner is fired alone prior to the start time of a time band for which an elevated desired temperature has been set.

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20. A domestic heat and power system according to claim 19, wherein the dchp unit controller is operable to receive information indicative of the temperature of the home and to predict whether the home will reach the desired temperature
25 in time for the start of the time band and, where the prediction is in the negative, is operable to cause the supplementary burner to fire thereby ensuring that the home does reach the desired temperature in time for the start of the time band.

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21. A domestic heat and power system according to claim 20, wherein the dchp unit controller is operable to record the

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time taken to reach the desired temperature of a time band for a plurality of previous days and to determine the length of the period during which the main burner alone is to be fired using these times.

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22. A domestic heat and power system according to claim 21, wherein the dchp unit controller is operable to increase automatically the length of a subsequent period during which the main burner alone fired if the supplementary burner is
10 fired to ensure the home reaches a desired temperature in advance of the start of the time band.

23. A domestic heat and power system according to any of claims 18 to 22, wherein when both heating and hot water are
15 required in advance of the start time of a time band, the dchp unit controller determines the dchp unit operating times according to a rule that the dchp unit operates for a first period to provide hot water immediately before a second period where the dchp unit operates to provide
20 heating.

24. A domestic heat and power system according to any of claims 18 to 23, wherein the dchp unit controller is operable to determine the dchp unit operating times such
25 that the main burner remains firing between periods.

25. A domestic heat and power system according to any of claims 18 to 24, wherein heating and/or hot water is maintained during a time band by the dchp unit under the
30 command of the dchp unit controller, whereby the dchp controller is operable to determine operation of the dchp unit according to rule that the supplementary burner is

switched between firing and idling in preference to switching the main burner between firing and idling.

26. A domestic heat and power system according to any of
5 claims 18 to 25, wherein the dchp controller is operable to control the firing rate of the supplementary burner and/or the main burner using a measure of the rate of change of the home temperature.

10 27. A domestic heat and power system according to claim 26, further comprising a thermistor-based thermometer operable to supply to the dchp unit controller the measure of the rate of change of the home temperature.

15 28. A domestic heat and power system according to any of claims 25 to 27, wherein the temperature of the main burner head is monitored.

20 29. A domestic heat and power system according to claim 28, wherein the dchp unit controller is operable to control the dchp unit to maintain a main burner head temperature of substantially 550°C.

25 30. A domestic heat and power system according to claim 29, wherein the dchp unit controller is operable to maintain the main burner head temperature by varying the flow of combustible fuel through the main burner.

30 31. A domestic heat and power system according to any of claims 27 to claim 30, wherein the dchp unit controller is arranged to switch the mains burner to idle if a main burner head temperature above an upper limit is measured.

32. A domestic heat and power system according to claim 31,
wherein the dchp unit controller is arranged to reduce the
temperature of the main burner head without setting the
engine burner to idle when a main burner head temperature
5 above a lower limit but below the upper limit is measured.

33. A domestic heat and power system according to any of
claims 16 to 32, wherein the programmer module is operable
to receive data input by a consumer corresponding to at
10 least two sets of time bands having start and end times, a
desired temperature for the home during that time band
and/or confirmation that hot water is required during that
time band, each time band spanning a twenty four hour period
and the consumer indicating which set is to be used for each
15 day of the week and wherein the dchp unit controller
implements the appropriate set on each day.

34. A domestic combined heat and power unit, for heating a
home, comprising a main burner and a controller, wherein the
20 controller is operable to control the firing rate of the
main burner with reference to a signal received that is
indicative of the rate of change of the home temperature.

35. A domestic combined heat and power unit according to
25 claim 34, further comprising a supplementary burner and
wherein the controller is operable to control the firing
rate of the main burner or the supplementary burner with
reference to a signal received that is indicative of the
rate of change of the home temperature.

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36. A domestic combined heat and power unit comprising a
main burner and a controller, wherein in use the temperature

of the main burner head is measured and the controller is operable to control the firing rate of the main burner to maintain a substantially constant temperature.

- 5 37. The domestic combined heat and power unit of claim 36, comprising a Stirling engine having a main burner and a supplementary burner, both of which are fired in use to provide heating and/or hot water.
- 10 38. A domestic combined heat and power unit according to claim 36 or claim 37, wherein the controller is operable to maintain a main burner head temperature of substantially 550°C.
- 15 39. A domestic combined heat and power unit according to any of claims 36 to 38, wherein the controller is operable to maintain the main burner head temperature by varying the flow of combustible fuel through the main burner.
- 20 40. A method of energy scheduling in a home comprising a dchp unit, a dchp unit controller, a domestic appliance and an energy scheduler, the method comprising the steps of:
- a consumer selecting hot water and/or heating requirements;
- 25 the dchp unit controller scheduling operation of the dchp unit to generate a hot water and/or heating schedule from the requirements selected;
- the energy scheduler scheduling operation of the domestic appliance to coincide with operation of the dchp
- 30 unit.

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41. A method of providing heating and/or hot water to a home comprising a dchp unit, a dchp unit controller, a domestic appliance and an energy scheduler, the method comprising the steps of:

5 a consumer selecting time bands having start and end times, a desired temperature for the home during that time band and/or confirmation that hot water is required during that time band; and

10 the dchp unit controller scheduling operation of the dchp unit to generate a hot water and/or heating schedule in accordance with the heating and/or hot water requirements selected such that the temperature of the home reaches the selected temperature and/or hot water is available at the start time of each time band.

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